

REMARKS

Reconsideration of this application, in view of the foregoing amendment and the following remarks, is respectfully requested.

Claims 1-12 were originally presented for consideration in this application. Claims 13-20 were added by previous amendment. Accordingly, claims 1-20 are currently pending in this application.

The following rejections and objections were set forth in the Office Action:

1. Claims 5 and 15 are objected to under 37 CFR §1.75(c) as being of improper dependent form.
2. Claims 1-5 and 7-20 stand rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 4,716,965 (Bol) in view of International Publication No. WO 03/008756 (Bosma).
3. Claim 6 stands rejected under 35 USC §103(a) as being unpatentable over Bol in view of Bosma, and further in view of U.S. Patent No. 2,230,626 (Miller).

Regarding the objection to claim 5, please note that this claim has been amended above to make it clear that it is the expandable material which extends from a retracted state to an expanded state. Claim 5 further requires that the expandable material extends from the retracted state to the expanded state as a reaction to exposure to the fluid in the space. Claim 1, from which claim depends, does not require these limitations. Instead, claim 1 requires that the annular element includes an expandable material which extends from a retracted state to an expanded state in response to contact with a fluid in the well system.

Clearly, a material can be in contact with a fluid without having a reaction to that fluid. Thus, claim 5 does indeed further limit the invention of claim 1. Accordingly, withdrawal of the objection to claim 5 is respectfully requested.

Regarding the objection to claim 15, please note that this claim has been amended above. Claim 15 now requires that the expanding step is performed as a reaction of the expandable material to exposure to the fluid. Similar to the discussion above in regard to the objection to claim 5, the claim from which claim 15 depends (claim 13) does not require that there is a reaction of the expandable material to the fluid. Accordingly, withdrawal of the objection to claim 15 is respectfully requested.

Regarding the obviousness rejections based on a proposed combination of the Bol reference with the Bosma reference, please note that independent claim 8 recites extending the expandable material into contact with the wall of the borehole. Bol specifically teaches that the thickness of the sheaths should be as low as possible in order to avoid obstructions of the flow of the cement slurry through the annulus during cementation and to create an annular cement mass with an almost uniform thickness throughout its height (col. 3, ll. 36-41). The purpose of the sheaths is to compensate for relatively minor (micro) displacement of the cement relative to the casing as the cement hardens (col. 2, ll. 50-62).

Bol does not disclose or suggest extending the expandable material into contact with the wall of the borehole as recited in claim 8. Instead, as pointed out above, Bol actually teaches away from using a sheath which would be thick enough to seal against the borehole.

Bosma discloses a wellbore with a vertical section that is cased and cemented, and an open hole horizontal section that is cased and divided into production intervals with multiple annular seal assemblies. The annular seal members are made of alternating portions of a material that swells upon contact with a hydrocarbon oil and a material that swells upon contact with water. Bosma discloses that, in the event of water coning, a suitable patch is used to close off the appropriate interval. Should the material

that swells upon contact with oil move to a retracted state due to discontinued contact with oil, the material that swells upon contact with water will expand to continue to provide isolation of the individual production intervals.

Bosma does not describe using the annular seal members in an area of the wellbore which is cemented. Instead, Bosma teaches using the annular seal members specifically where the wellbore is not cemented. There is absolutely no motivation whatsoever for a person skilled in the art to use the Bosma annular seal members in a method such as that recited in claim 8, where the castable material extends about the annular element. This is especially true in light of Bol's teaching away from using a sheath thick enough to seal against the borehole.

Thus, the rejections do not satisfy the requirements set forth in the seminal U.S. Supreme Court case of *Graham v. John Deere* for evaluating whether an invention would have been obvious to a person of ordinary skill in the art at the time the invention was made. These requirements include determining the level of skill of the person having ordinary skill in the art, the scope and content of the prior art, and the differences between the claimed invention and the prior art. Additional considerations may include factors such as failure of others to solve the relevant problem, long felt but unsatisfied need, skepticism of others, teaching away in the prior art, unexpected results, copying, the pace of innovation in the art, commercial success, industry accolades, etc.

In the *Graham v. John Deere* opinion, the Supreme Court also explicitly warned against "slipping into use of hindsight" in obviousness determinations. *Graham v. John Deere Co.*, 383 U.S. 1, 36 (1966). Additionally, in the more recent case of *KSR v. Teleflex*, the Supreme Court has reiterated that an invention's merit is not to be evaluated from a perspective of a person having the benefit of already knowing the solution conceived by the inventor, but rather as it would have been perceived by a person having only ordinary skill in the pertinent art. *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1742-43 (2007).

In the present case, the person having ordinary skill in the art would likely have a bachelor's degree in engineering or a related applied science field, and would likely have several years' experience in designing sealing systems for use in subterranean wells.

The scope and content of the prior art have been discussed above. Bol specifically teaches that a foam sheath can be used to seal off "micro"-annulus spaces between casing and cement when the cement hardens, but teaches directly away from making the sheath any thicker, for to do so would interfere with cement flow in the annulus surrounding the casing. Furthermore, Bosma teaches that expandable annular seal members are to be used only where cement is not placed around a tubular string in a wellbore. No person skilled in the art having knowledge of the Bol and Bosma reference teachings would combine them to produce the invention of claim 8, since both of the references teach away from that invention.

The Board of Patent Appeals and Interferences recently addressed this issue in *Ex Parte Whalen II* (Appeal 2007-4423, July 23, 2008) as follows:

The U.S. Supreme Court recently held that rigid and mandatory application of the "teaching-suggestion-motivation," or TSM, test is incompatible with its precedents. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). The Court did not, however, discard the TSM test completely; it noted that its precedents show that an invention "composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *Id.*

The Court held that the TSM test must be applied flexibly, and take into account a number of factors "in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed." *Id.* at 1740-41. Despite this flexibility, however, the Court stated that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements in the way the claimed new invention does." *Id.* "To facilitate review, this analysis should be made explicit." *Id.*

[W]hen the prior art teaches away from the claimed solution as presented here . . . obviousness cannot be proven merely by showing that a known composition could have been modified by routine experimentation or solely on the expectation of success; it must be shown that those of ordinary skill in the art would have had some apparent reason to modify the known composition in a way that would result in the claimed composition.

In the present case, no convincing reasoning has been presented as to why a person skilled in the art would have been motivated to make the invention recited in the

claims. Instead, the cited Bol and Bosma references each teach directly away from the claimed invention, as in the *Ex Parte Whalen II* case (in which the Board reversed an obviousness rejection). Accordingly, withdrawal of the obviousness rejections of claims 8-12 is respectfully requested.

Regarding the obviousness rejections of independent claims 1 and 13, please note that independent claim 1 requires that the device expands into a space defined by a castable material disposed radially between and in contact with the borehole and the device, and an annular element of the device includes an expandable material which extends in response to contact with a fluid. Independent claim 13 requires expanding the expandable material into the space in response to contact between the expandable material and the fluid. In contrast, Bol discloses that the sheaths will interrupt the propagation of a micro-annulus along the casing because of the resilient tendency toward expansion of the foam layers of the sheath (col. 3, ll. 3-14). Bol does not disclose or suggest that the expandable material expands into the space in response to contact between the expandable material and a fluid.

Bosma is cited for its disclosure of expandable annular seal members which expand in response to contact with fluid in a well. However, as discussed above, Bosma teaches that the expandable seal members should be used only where the wellbore is not cemented. In Bosma's system, there is no castable material disposed radially between an expandable material and a borehole as required by independent claims 1 and 13. Instead, Bosma teaches that an expandable seal member is not used where the wellbore is cemented.

Similar to the discussion above regarding the rejection of independent claim 8, there is simply no motivation for a person skilled in the art to make the proposed combination of the Bol and Bosma references. Each of these references teaches directly away from the invention recited in independent claims 1 and 13, and so the rejections do not satisfy the requirements set forth in *Graham v. John Deere* for evaluating whether an invention would have been obvious to a person of ordinary skill in the art at the time

the invention was made. Accordingly, withdrawal of the rejections of independent claims 1 and 13, and their dependents, is respectfully requested.

In view of the foregoing amendment and remarks, all of the claims pending in this application are now seen to be in a condition for allowance. A Notice of Allowance of claims 1-20 is therefore earnestly solicited.

The examiner is hereby requested to telephone the undersigned attorney of record at (972) 922-6369 if such would expedite the prosecution of the application.

Respectfully submitted,

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I hereby certify that this correspondence is being filed in the U.S. Patent and Trademark Office electronically via EFS-Web, on February 3, 2010.

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